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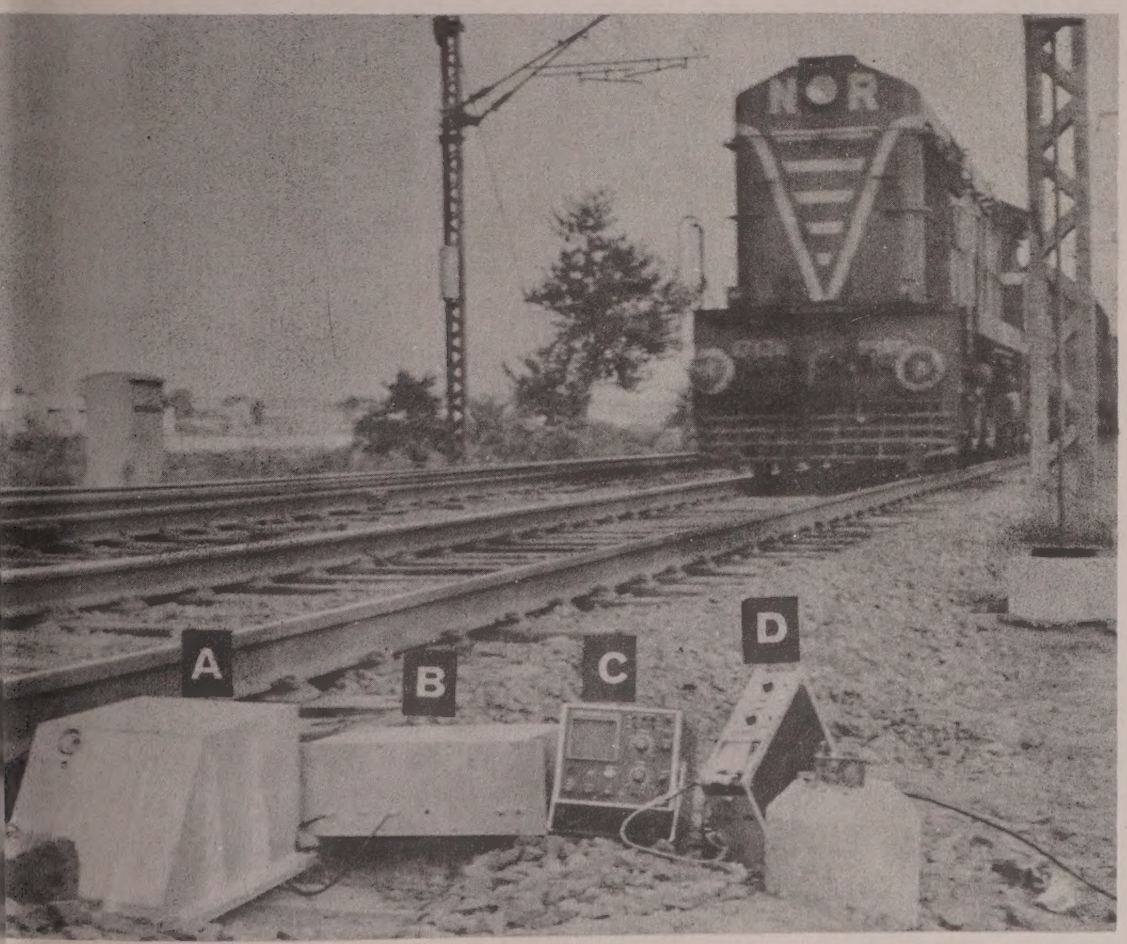
NPL develops a system to detect hot journal boxes of trains

otype of a system to detect hot (axle) boxes of trains has been ped by the National Physical itory (NPL), New Delhi, for use dian Railways. The Railways losses amounting to tens of s of rupees on broad gauge alone e of under-utilization of wagons gies due to overheating of journal Hot axles resulting from ating of wheel bearings lead to l runaway, which in turn results echanical failure, fire and nent.

system which NPL has developed remotely an overheated journal box before it becomes hazardous, and thus enables preventive maintenance. The basic principle of the system is to sense remotely the infrared radiation emitted by each of the journal boxes of a moving train. The radiations are detected instantly and measured accurately with respect to the ambient by a scanner using an infrared sensor and electronic processing techniques. Located at the track side, the scanners are automatically turned ON with the help of transducers mounted on the rails and operate only when the train is actually passing. Both during the day and during night the system operates equally well even under extreme environmental conditions. Effects of extraneous heat radiations are eliminated by using precise optics, spectral filtering and electronic circuit discriminators. In between the scanning interval, the scanner looks at the underside of the train, providing a reference level of the ambient. Two scanners, one on each side of the track, are located on the track side to pinpoint the side of the train where the journal box is overheated. Each scanner consists of a protective shutter; a precision optical system; two fast, highly sensitive identical infrared sensors (on one of the sensors radiation from the axle is incident; the other sensor is shielded from these radiations); and a low-noise and sensitive preamplifier. The electrical pulses proportional to the energy radiated by the journal box are suitably processed and recorded for each of the axles of a moving train. The pre-amplified electrical signal is then processed in such a manner as to be recorded on a dual-channel high-speed strip-chart recorder or to be displayed on a digital read-out. The digital read-out system developed with the hot axle



ype of hot axle box detection system mounted on railway track near Sahibabad [A—Scanner —Processing electronics unit, C—Oscilloscope, and D—High-speed strip-chart recorder]

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box system provides an instant and convenient means of obtaining an immediate warning and an identification of the exact location of a hot box on either side of a passing train. It provides an audible warning system as well as a visual display of the precise location of overheated journals. The processing electronic modules conform to the IS specifications on environmental and vibration tests.

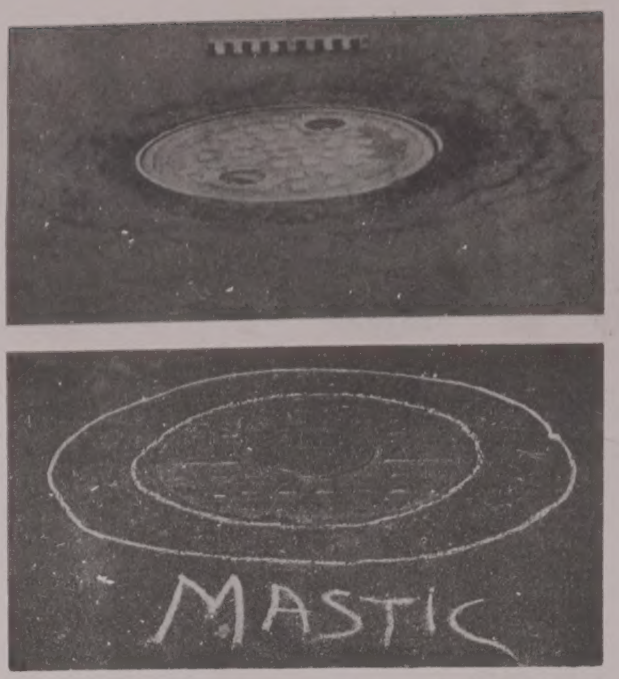
Following successful laboratory trials at various simulated train speeds of up to 150 kmph the system was mounted on the track near Sahibabad railway station to monitor the temperature of journal boxes of trains in-bound to Delhi/New Delhi railway stations. A large number of goods and passenger—local as well as superfast—trains, covering a wide spectrum of train speeds, were monitored.

Preproduction models of the hot axle box detection system consisting of track-side scanners, digital locator, and line telemetry equipment for analog transmission of heat signals to a remote recorder and alarm system are being fabricated at NPL. The entire system is expected to be ready by the middle of 1982. The commercial model based on NPL know-how will be produced by the Central Electronics Limited in collaboration with the laboratory.

The project is financed by the Department of Science & Technology. □

CRRI develops techniques for rehabilitation of bituminous surfacing around manholes

The bituminous surfacing around manholes in city roads poses maintenance problems. Owing to non-accessibility of road roller there is poor compaction of surfacing, and consequently potholes develop around their periphery, which affect riding quality and increase chances of accidents. In order to overcome these problems, the Central Road Research Institute (CRRI), New Delhi, has developed a new technique of application of mastic asphalt composition around manholes.



Pictures show distress around a manhole (*top*) and finished surface (*bottom*)

The technique: The existing bituminous surfacing around the manhole is removed up to a width of about 25 cm and a depth of about 10 cm. A freshly prepared bituminous macadam mix is filled in this cavity and compacted by hand-tamping so that the top depth of 2.5 cm is left open for being filled up with mastic asphalt composition. It is heated to liquid consistency, poured in the residual cavity, trowelled and allowed to cool. When partially cooled, bituminous precoated stone chips are embedded in the composition to make the finished surface skid-resistant. At atmospheric temperature, the surface becomes hard enough to withstand traffic.

The technique has been successfully tried on Bombay city roads. □

Cellulose Acetate Benzoate Osmotic Membranes

A new polymeric osmotic membrane based on indigenously prepared cellulose acetate benzoate (CABz) and superior to cellulose acetate and cellulose triacetate membranes has been offered by the Central Salt & Marine Chemicals Research Institute (CSMCRI), Bhavnagar. This is the result of systematic work carried out by a research fellow, Kum. Minaxi D. Vyas. The work entailed preparation of CABz and osmotic membranes therefrom, characterization of the membrane, and study of its special applications a morphology.

Preparation and characterization CABz: The polymer, which has also special application as a plastic mater has not been reported being industria produced so far. The raw materials indigenously available. The process preparing the polymer was optimized a laboratory scale (100 g) and s cessfully extended to bench scale (2 k

The process consists in reacti cellulose acetate of a specific molecu weight and degree of substitution w benzoyl chloride in a suitable solv with a particular catalyst complex fo certain time at a moderately hi temperature. After the completion benzoylation reaction, the catal complex is broken and CABz polym formed is precipitated, filtered, washe purified, dried, and pulverized.

The polymer was characterized w respect to total ester content, degree substitution (d.s.), degree of polyme zation (d.p.), molecular weight (mol. w solubility, etc. The CABz obtain under optimum conditions had t following characteristics: total est content, 42.14%; d.s., 2.7; acet content, 35.10%; benzoyl content, 10 hydroxyl content, 1.73; mol. wt, 35,00 40,000; and d.p., 120-130.

Preparation of osmotic membrane The osmotic membranes prepared fro the cellulose mixed esters are reported be superior to the conventionally use cellulose acetate (CA) membrane CABz, an aliphatic-aromatic mixe ester possessing greater mechanic strength and better stability, is reporte to have better osmotic properties als Since conventionally used CA mem branes are prepared from a terna composition system, CABz membran were also developed from a terna system using CABz (polymer), aceto (solvent) and formamide (additive). Th conditions optimized for the prepar tion of the osmotic membrane are follows:

COMPOSITION: CABz—23 part formamide—30 parts, and acetone 47 parts.

14 OCT
C.F.T.R.I., MYSORE

TING CONDITIONS: Solvent evap-
n period—30s at room temp.,
temp. & time—0-2°C, 60 min;
ing temp. & time—80°C, 3 min;
rane thickness—0.20-0.22 mm;
H—60-65%.

osmotic properties of CABz were
red with those of CA membranes
aneously, and the data obtained
follows:

	CA	CABz
ection, %	90-91	94-95
d	10-11	13-14

data obtained for small, flat
ranes were later confirmed for 2 ft
r and 3 ft × 1 in. big, flat osmotic
ranes. Data were also obtained
embranes cast on different plastic
es in place of glass surface. In all
the CABz membranes showed
r performance than CA
ranes.

osmotic properties of membranes
been correlated with transport
rties and other characteristics.

m the nature of the membrane
n it was visualized that CABz
ranes should be suitable for
ating some polar compounds from
us solutions such as boric acid and
which have industrial appli-
ns. This was confirmed experimen-
CABz membranes gave 58-60%
ion for boric acid and 60-62%
ion for urea, while CA membranes
only 20% rejection for both these
ounds.

e data obtained under optimized
tions were also supported by a
of morphology of the membrane
a scanning electron microscope.
s, taken for the top layer, cross-
nal area and bottom layer, clearly
ed the superiority of CABz
branes over CA and cellulose
tate membranes.

m. Vyas, who carried out the
es under the guidance of Dr I.C.
y of the same laboratory, was
ded Ph.D. degree (1981) in
istry by the Bhavnagar University,
nagar, for the thesis based on the
tigations. □

LTC plant working demonstrated

The Regional Research Laboratory, Hyderabad, has successfully demonstrated the working of the 900 tonnes per day low-temperature coal carbonization (LTC) plant which, it may be mentioned, has been set up at Naspur, Andhra Pradesh, by Singareni Collieries Co. Ltd on the basis of technology provided by this laboratory and engineering services provided by Engineering Projects (India) Ltd. During guarantee runs, one of the three carbonizers was run continuously for a period of 72 hr when the throughput of coal, yields of coke, tar and gas, and volatile matter of the coke were found within the guarantees given to the company by the laboratory.

When it reaches its ultimate capacity, this totally indigenous public-sector plant is expected to meet a large part of the domestic fuel requirements of urban population in Andhra Pradesh. LTC plants provide not only an alternative and cheap domestic fuel to wood charcoal, but greatly contribute to the conservation of fast depleting forest wealth. The byproduct tar will be a valuable source of phenols and hydrocarbons, now mostly obtained from petroleum. □

Get-together on Simulation and Optimization

A get-together of CSIR scientists on 'Simulation and Optimization' was held at the Regional Research Laboratory (RRL), Hyderabad, on 17-18 August 1981. Some 90 scientists from seven CSIR laboratories — Structural Engineering Research Centre (SERC), Madras; National Chemical Laboratory (NCL), Pune; National Metallurgical Laboratory (NML), Jamshedpur; Central Salt & Marine Chemicals Research Institute (CSMCRI), Bhavnagar; Central Electrochemical Research Institute (CECRI), Karaikudi; RRL, Jorhat; and RRL, Hyderabad, besides the Regional Computer Centre, Pune, participated in the get-together.

Because of the growing potentialities of fast computers as also of ease of access to them, simulation has emerged today as a powerful tool through mathematical modelling of a system for predicting its performance under various operating conditions. This can be applied prior to building a new system, or to improve upon the performance of an existing one. In both situations, the aim, obviously, is to locate conditions under which the system performance is at its optimum, accounting at the same time for all the physical constraints as well as economic limitations; this is the purview of optimization.

Hence the objective of the get-together was to assess the capability developed in CSIR laboratories in the fast-growing areas of computer-aided simulation and optimization. These, identified by CSIR as thrust areas for the future, can play an important role in increasing productivity from manufacturing plants, conservation and better utilization of material and energy resources and to generate highly useful design information for the future.

In the first two sessions the work done in the above areas at NCL, CSMCRI, RRL-Jorhat and RRL-Hyderabad was presented by scientists from the respective laboratories. Features of a Simulation Language Compiler were presented by the International Computers India Manufacturers Limited in the third session.

The fourth session addressed itself to discussions on how the generated capability could be fully utilized in the broader national interest of achieving self-reliance. The discussions brought out the importance of holding similar get-togethers with organizations outside CSIR, large-scale industry, R & D units and design organizations in order to create interest in the potentialities of these modern methods. Holding of summer schools was also considered useful. In addition, cooperation between various groups in one institution and among various CSIR institutions, particularly through exchange of

information and computer programs, was emphasized. Formation of sub-groups for different simulation activities, such as of reactors, separators, process flowsheeting, and computer-aided design, could be extremely fruitful, the get-together suggested. □

Industry and Research

GET-TOGETHER AT RRL-BHUBANESWAR

To apprise industry of their latest utilizable know-how as also to ensure industry's participation in their R & D programmes, CSIR laboratories organize from time to time get-togethers of their scientists with industry's representatives. At one such get-together organized, on 10 June 1981, by the Regional Research Laboratory (RRL), Bhubaneswar, eight processes and products of CSIR laboratories, were exposed to industrialists and entrepreneurs. Five of the process/product schemes exposed were the results of this regional laboratory's R & D work. These related to production of (i) sodium chromate, (ii) metal powders by electrodeposition, (iii) direct-current power supplies and inverters, and (iv) potential drugs from plants of Ganjam district, and (v) cultivation of palmarosa and production of oil. The rest of the processes/products were from other CSIR constituents: electrolytic manganese dioxide (Central Electrochemical Research Institute, Karaikudi), utilization of rice husk ash for making sodium silicate (Central Glass & Ceramic Research Institute, Calcutta), and cashew apple juice (Central Food Technological Research Institute, Mysore).

A panel discussed natural resources based industries and made some concrete proposals regarding the setting up of new industries in the region.

The get-together was inaugurated by the Union Minister of State for Industry, Shri Charanjit Chanana, who underscored, as did Prof. P.K. Jena (RRL's Director) in his address earlier, the importance of a continuous linkage between the laboratories and industries. 'Each industrial unit should be practically a terminal in the technological development of the country and the terminal should be linked with the nucleus of the laboratory in different fields', observed the minister. Calling upon scientists to see that the impact of science and technology is felt at the village level and that this regional laboratory's fruits reach as many people as possible in the region, Shri Chanana desired that this laboratory should planners in modelling the indu development of the state. Or Minister of State for Industries, K.C. Patel, presided.

The laboratory had also arrange exhibition to depict its R & achievements. Two other C laboratories—CGCRI, Calcutta, Central Scientific Instrum Organisation, Chandigarh—also p cipated in the exhibition.

Recent Developments in Building Materials and Construction Techniques

CBRI's Seminar & Exhibition

To apprise field engineers, architects, builders, materials manufacturers and others with the new building materials which it has developed to solve their acute shortage, and new construction techniques which it has evolved to reduce the overall cost and time of construction, the Central Building Research Institute (CBRI), Roorkee, organizes periodically seminars and exhibitions at various centres. One such seminar, organized in collaboration with the Institution of Engineers (India) of Orissa State Centre and Orissa Engineers Congress, was held in Bhubaneswar from 26 to 28 July 1981.

Inaugurating the seminar, Shri Niranjan Patnaik, Orissa's State Minister for Irrigation and Power, focused the attention of building research scientists and technologists on the need to solve the formidable housing problem in rural as well as urban areas. Impressed by what CBRI had already done in solution to this problem, the minister urged the state's engineers and architects and all those concerned to adopt the new and alternative building materials and techniques which CBRI has developed.

The institute, on its part, projected its achievements through technical talks delivered by its scientists: (i) Research and developments in building materials (N.C. Majumdar); (ii) Appropriate building technologies for eastern and north-eastern region of India (R.C. Mangal); and (iii) Research on effici of buildings for energy and vironmental comfort (B.K. Saxena)

In the first talk, Shri Majumdar ca upon the building industry and terials manufacturers of Orissa Stat make greater use of CBRI's expertise making quality bricks from black co soils and red soils. Stating that sev useful building materials could manufactured from a number of a industrial wastes, which pose m problems of disposal and environme pollution, the speaker cited the foll ing examples:

1. Fly ash—a waste of thermal po plants—for making pozzolanic cem concrete, mortar, light-weight aggreg and clay-bonded fly ash bricks
2. Slags from steel plants for produc portland blast furnace slag cement
3. Mining rejects and other indust wastes such as lime sludges fr chemical industries for making bri and flooring tiles
4. Coconut and other agricultu fibres/wood wool for making c rugated roofing sheets and build boards.
5. Rice husk, and lime sludge—a wa of sugar, paper, acetylene and carb industries—for making cheap cem titious binder for foundation maso work and plastering
6. Lime kiln rejects for making li based pozzolanic mixture.

isting the various cost-saving struction techniques which CBRI developed, the second speaker, Shri ngal, explained those relating to er-reamed piles, skirted foundation, e wicks, etc. which would be suitable adoption in different types of sub-s. He also dealt with various types of nomical roofing/flooring tech-ues, both prefabricated and cast in-, like channel units, cored units, R.C. nks, brick panels, waffle units, ribbed , and L-pan roofing. Improved hods of construction with simple gets, use of secondary species of ber, of chimney to avoid smoke ards in kitchens, etc. were the other ics covered. The work done by CBRI the construction of better and able rural houses was highlighted. e refrain of Shri Mangal's talk was, essarily, the use of locally available terials in construction work.

The importance of heat, light, ntilation and acoustics in planning a ilding was emphasized by the third aker, Dr B.K. Saxena, who also sented some standards relating to the ove parameters. He also highlighted RI's efforts towards utilization of ar energy as a result of which it has veloped water and space heating stems.

A demonstration of casting tech-ques of a few precast building mponents as developed by CBRI was ranged. Also organized concurrently s an exhibition depicting CBRI's rk.

See CN 31(1981), 90-91 for more formation on the topic.] □

Conference Briefs

International Congress of Pharmacology

r B.N. Dhawan of the Central Drug esearch Institute (CDRI), Lucknow, d a five-member Indian delegation onsored by the Indian National cience Academy to the eighth Inter-ational Congress of Pharmacology eld in Tokyo, 19-24 July 1981.

Some 4000 pharmacologists from 56 countries participated in the conference, which, comprising a series of lectures, symposia and workshops, provided an opportunity to the conferees to get first-hand information on the achievements and current research interests of the host country's pharmacologists, observes Dr Dhawan.

The CSIR scientist, who also represented the IUPHAR council, further reports:

Seventeen invited lectures by specialists were delivered which covered such topics as: enkephalins, catecholamine uptake, regulation of food intake and satiety, antiviral chemotherapy, immunological control mechanisms, and 'pure' 5-HT antagonists.

Twenty-six symposia were organized which covered topics ranging from clinical pharmacology of drugs modifying immune responses, receptor antibodies, neurotransmitters, substance P, and opioid peptides to prostacyclins, sleep regulation, and cardiotonic and anti-inflammatory drugs. Dosage modification in disease states, models and quality control of laboratory animals, and teaching and learning in pharmacology were the offbeat subjects. The last symposium laid stress on undergraduate teaching and problems faced by developing countries. The need for uniformity of standards of teaching within a country and between countries and the mechanism of achieving these, particularly in developing countries, were discussed.

Eight workshops ran concurrently with the symposia, one of them discussing the mode action of drugs used in China, Japan and Korea. The need for a wider coverage of Asian medicinal system was brought out during discussions. Several workshops were devoted to various aspects of neuropharmacology, greater stress being laid on the development of suitable models than on the results achieved.

The last part of the scientific programme consisted of free communication through 2000 posters and 130 papers, five of them from India. Dr Dhawan was appointed chairman of a scientific session on oral presentations.

A large number of satellite symposia were organized in various parts of Japan at the conclusion of the congress. □

Deputation Briefs

Dr Janardan G. Negi of the National Geophysical Research Institute, Hyderabad, visited West Germany from 25 April to 31 May 1981 under CSIR-DAAD Exchange of Scientists Programme. Among the institutions which Dr Negi visited were: Bundesanstalt fur Geowissenschaften und Rohstoffe (BGR), Hannover, and geophysical institutes of (i) University of Hamburg, Hamburg, (ii) University of Gottingen, Gottingen, and (iii) University of Karlsruhe, Karlsruhe. Dr Negi studied recent advances in geoelectromagnetics, mathematical modelling of lithosphere and upper mantle, geophysical signal processing, and management of research in geosciences.

At BGR Dr Negi got acquainted with the helicopter geophysics activities and their electromagnetic model tank studies. The visit provided him an opportunity to study recent developments in aeromagnetic data interpretation, observational seismology, and marine geophysical surveys. Prof. Hahn, head of Aeromagnetic Interpretation Group of BGR, showed great interest in NGRI's interpretational work dealing with multi-level aeromagnetic survey over Deccan Trap flood basalts, observes Dr Negi. Dr Weidelt (BGR) and Dr Meyer (University of Gottingen) have experimental confirmation of Dr Negi's work on 'Enhancement of detectability of ore bodies in conducting environments'.

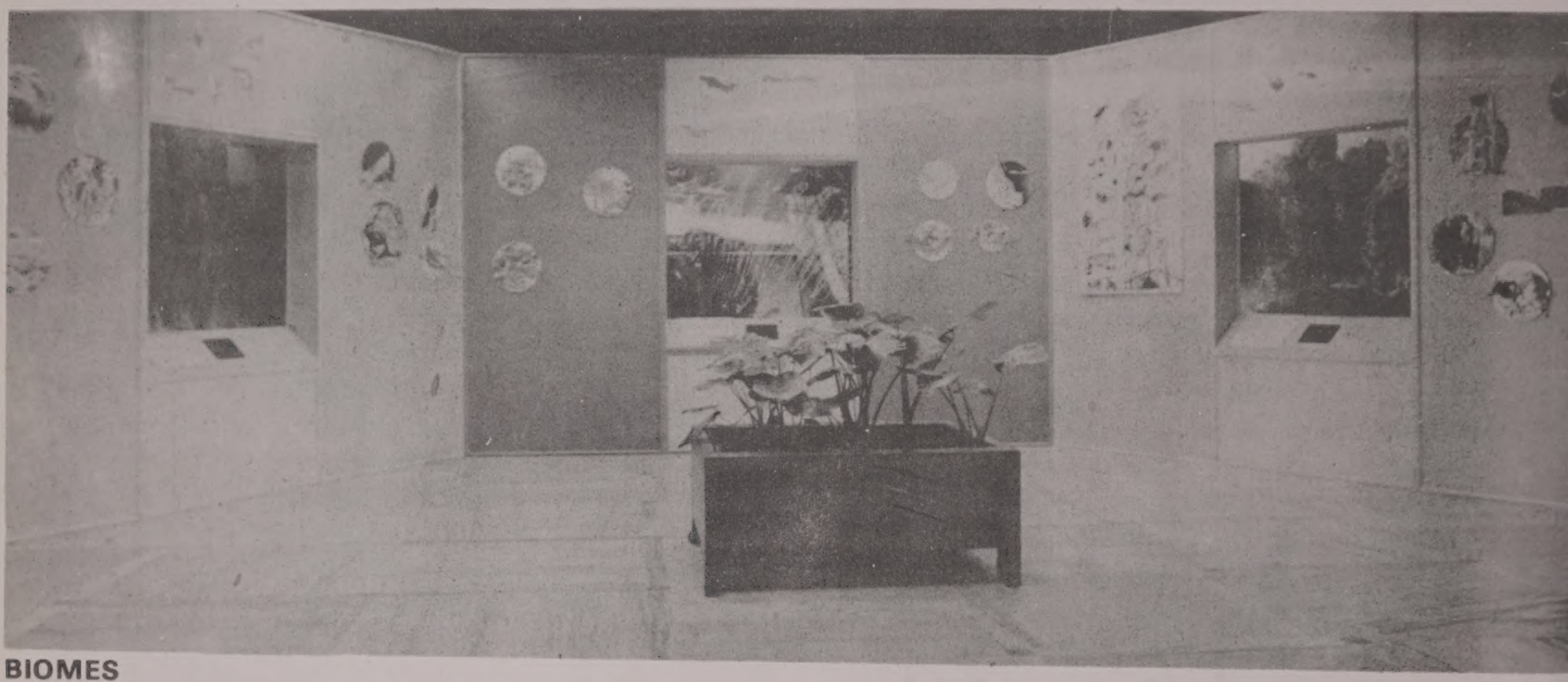
Dr Negi delivered lectures on 'Theory of negative electromagnetic screening' at BGR, Hannover, and at the University of Gottingen; he also gave a popular talk at this university on the strategy for development of quality of life in India. □

CEERI provides audio-visual animation to 'Environment' exhibition

For the 'Environment—the choice before us' exhibition held at Parliament House Annexe, New Delhi, from 3 to 9 September 1981, the Central Electronics Engineering Research Institute (CEERI) Extension Centre at New Delhi provided synchronized light and control systems, guidophones, microprocessor-based control systems and proximity reception systems—devices which CEERI Extension Centre has specially designed for exhibitions. Systems like the ones used at the exhibition are not produced in the country and CEERI is the pione this field in India.

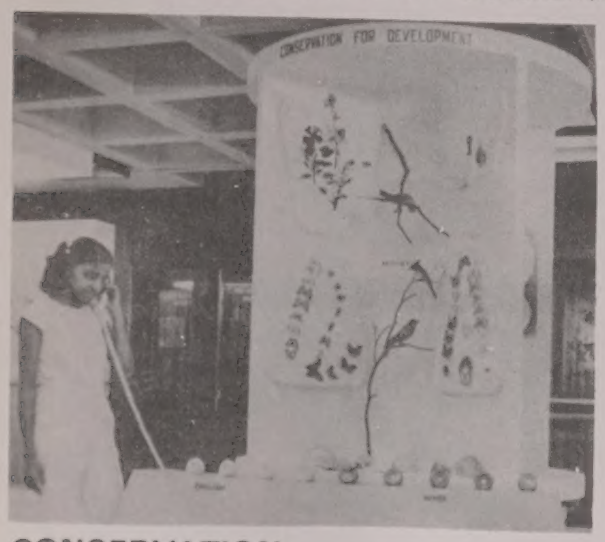
The exhibition, organized by National Museum of Natural Histo the Department of Environmen educate, especially, the politician, inaugurated by the Prime Minister Indira Gandhi on 3 September.

The descriptions of the various syst are given along with the captions to photographs of exhibits.



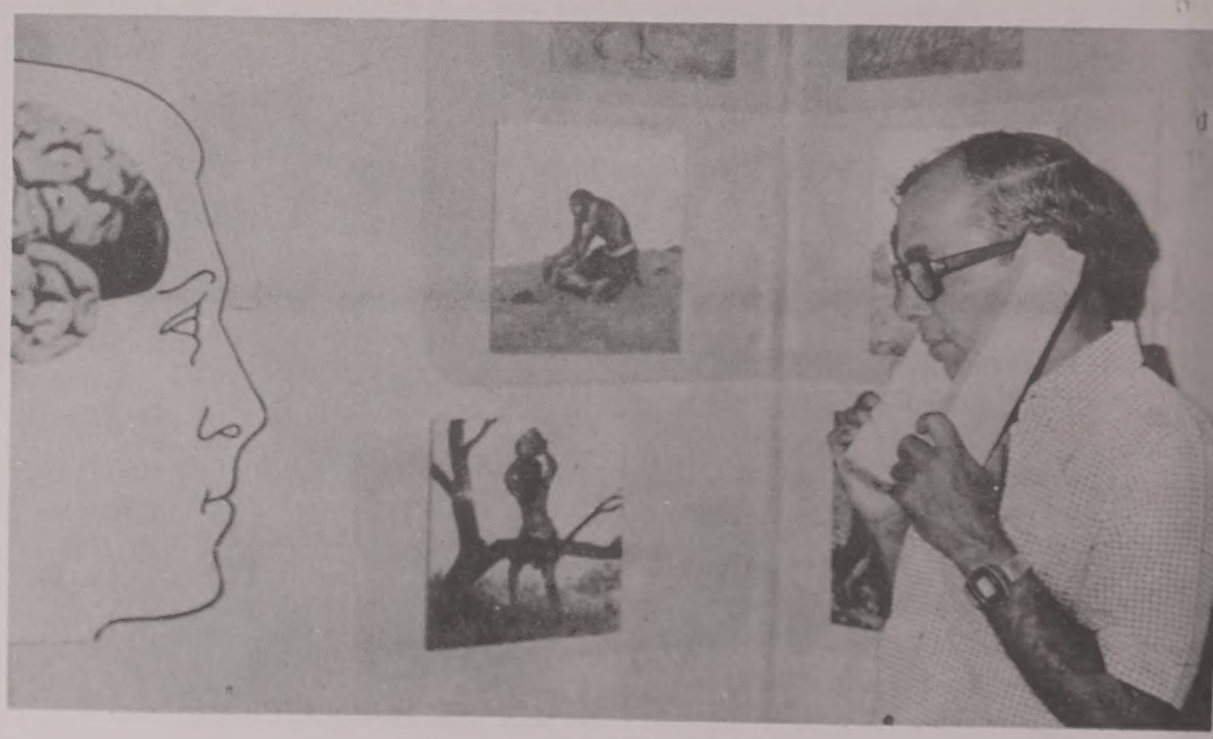
BIOMES

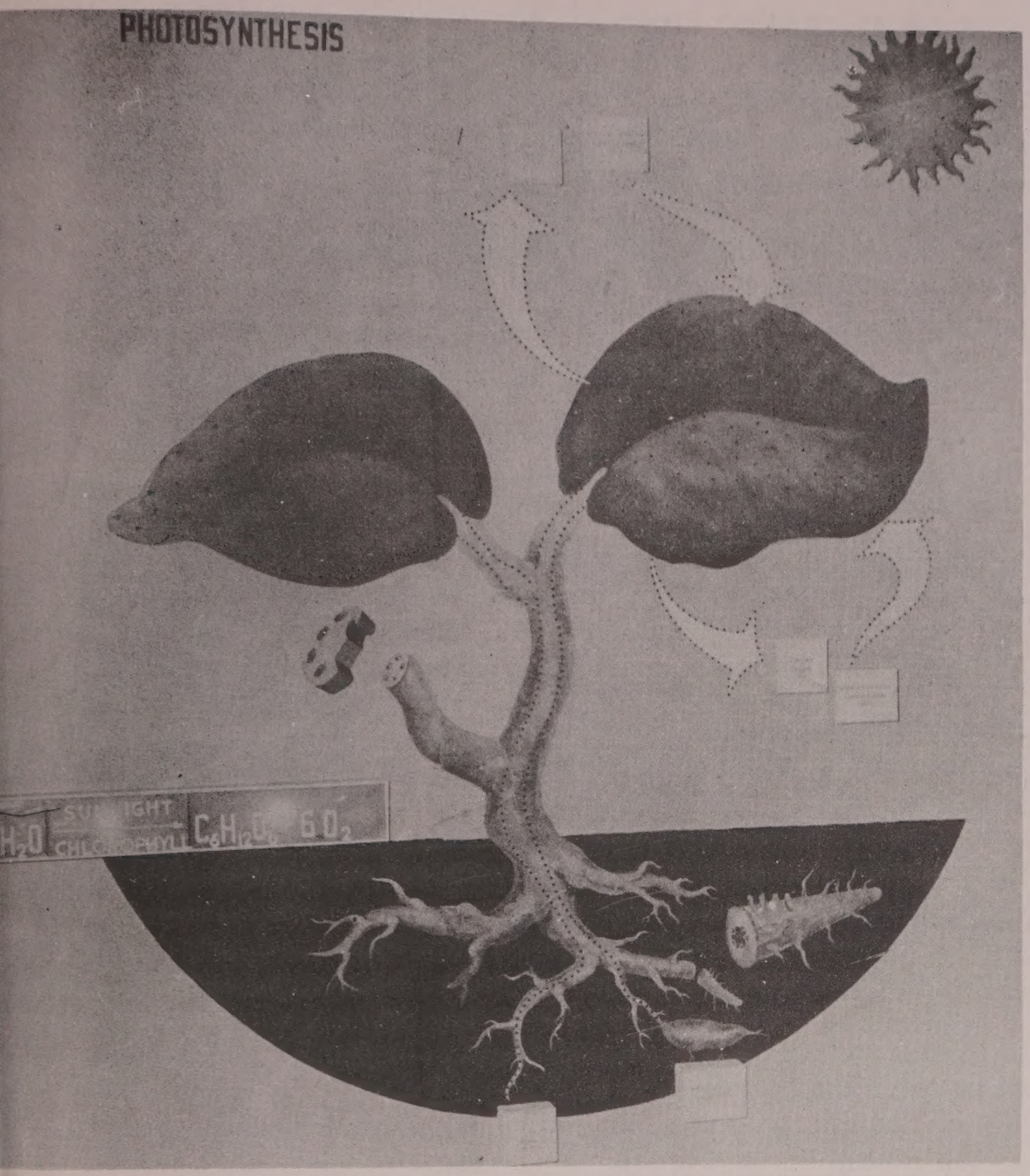
In this exhibit, synchronized light and sound control system for the display shows the natural life-supporting regions of the earth, such as oceans, forests, deserts and grasslands, through illuminated translides and commentaries. The description of these translides is played through a cassette tape recorder. As the description for a particular translide is being played, the light in the translide is switched ON. Simultaneously the light in the previous translide is switched OFF. Along with the change light, sound location is also shifted. This sequence continues all the translides. After the commentary for all the translides completed, the equipment automatically switches OFF and ready for the next round. The language of the commenta recorded both in English and Hindi, could be selected by switch.



CONSERVATION

The general description of the exhibits on conservation is played through a tape recorder. The visitor listens to the commentary through guidophones.





OTOSYNTHESIS

icroprocessor-based control system explains the process of photosynthesis in plants simple visual manner. The process of flow of carbon dioxide from the air, water and eral salts from the soil to the plant is shown by 'river flow' lights. Subsequently the otosynthesis process in the leaves in the presence of sunlight is shown by switching and OFF small lights fixed in the leaves of the display. The sun is depicted by itching ON of a light. The production of oxygen and carbohydrates is shown by other set of 'river flow' lights. The whole process is shown at different speeds. First, the ctions are shown at a slow pace, and then are steadily changed into a faster pace. The cycle is kept ON for 1 minute and switched OFF for 10 seconds. The process ntinues to repeat automatically.

UMAN BRAIN & ITS ACCOMPLISHMENT

e commentary on the exhibit is heard through a 'proximity reception' system. It is a nsmitter-receiver type system which has the novelty of restricting the transmission to a ited area—a feature which permits the installation of a number of such systems in oximity to each other without mutual interference, although all the systems will be erating at the same frequency. The commentary on the exhibit is played through a tape corder. The visitor starts listening to the commentary, as soon as he comes near the nibit, through a hand-held receiver. The reception stops as he steps out of the area. The in advantage of this sytem is that there is no disturbance to other visitors since hand- s are used for listening to the commentary. □

EXTRAMURAL RESEARCH

Role of Parthenium in Allergies

The Compositae weed *Parthenium hysterophorus*, which was accidentally introduced into India, is posing agricultural and health hazards. Hence a systematic study was carried out by a CSIR research fellow, Kum. Mangala Seetharamiah, at the Department of Biochemistry, Indian Institute of Science, Bangalore, to assess the role of this weed in causing various types of allergies.

Clinical studies on persons directly exposed to the weed have shown that even though a large percentage was sensitized to the weed, relatively few of them developed the clinical symptoms. The allergenicity of the weed towards domestic animals was also investigated.

Mouse was used as the laboratory animal mode system for the production of persistent and the boosterable IgE antibodies to crude extracts of *Parthenium* pollen. Four proteins designated as proteins I, II, III and IV were isolated and purified from the crude aqueous extracts of *Parthenium* pollen and their allergenicity in mice was estimated by PCA reaction.

Aerobiological studies indicated the presence of significant amounts of *Parthenium* pollen in the atmosphere. Hence, the role of this pollen in causing type I allergy in humans was assessed by skin tests and radioimmunoassay. Allergen-specific IgE antibodies were present in the sera of only those rhinitis patients who showed positive skin test reactions. Protein IV, the major *Parthenium* pollen protein, was established to be the major allergen in both mice and humans. □

Effect of Testosterone-Oestradiol Combinations on Fertility

To effect male infertility in the Indian gerbil (*Tatera indica indica*) the potentiality of testosterone-oestradiol combinations has been investigated by Shri

T.O. Sasidharan, a CSIR research fellow, at the Division of Animal Studies, Central Arid Zone Research Institute of the Indian Council of Agricultural Research at Jodhpur. The hormones were also tested individually to study the effect on the male gerbil's reproductive system.

Although there were certain adverse effects in the reproductive system when treated with the two hormones individually, the effects were not as pronounced as when treated with combinations of the two hormones. A combination of the two hormones containing 90 μg of testosterone propionate and 0.015 μg of oestradiol benzoate administered daily for 10 days was found to affect the weights of the reproductive tissues, sperm concentration in the various segments, and various biochemical constituents in the reproductive tract significantly.

The findings indicate that suitable combinations of the two hormones could be employed for fertility control in the male. □

PERSONNEL NEWS

Appointments/Promotions

Dr G.C. Joshi

Dr G.C. Joshi of the Indian Institute of Petroleum (IIP), Dehra Dun, has been promoted, on assessment, as Scientist EII (16 April 1981). Dr Joshi has been heading the additives laboratory of IIP's Petrochemistry Division since 1975. Currently he is guiding a research team working on the organic synthesis related to petroleum additives. His research interests include mechanistic and synthetic organic chemistry and application of instrumental techniques to the solution of these problems.

Dr Joshi (born 29 July 1933) obtained his B.Sc. from the Allahabad University, M.Sc. from the Agra University, and Ph.D. in organic chemistry from the University of Western Ontario, London, Canada, in 1968. He started his career with the Defence Research Laboratory (Materials), Kanpur, in 1952 and continued there till 1973 when he moved to Vikram Sarabhai Space Centre, Trivandrum. At VSSC Dr Joshi was engaged in the synthesis of specialty chemicals used in composite propellent binder systems. He joined IIP in 1975.

Dr Joshi is a recognized Ph.D. guide of Kanpur, Meerut and Roorkee universities. □

* * *

Dr V.R. Balasubrahmanyam has been appointed, on promotion, Scientist C in a rural development programme project at the National Botanical Research Institute, Lucknow (27 July 1981). □

Honours/Awards

Shri C. Rajagopal of the National Aeronautical Laboratory, Bangalore, has been awarded 'deploma de honneur' of 'Excellence' by Federation Internationale d'la Art Photographique for his 'efforts and technical achievements in the art of photography and for eminent services rendered to the cause of photography'. FIAP is the apex body in photography to which about 100 national federations are affiliated and which represents 'photography' on the Unesco Council. □

Dr L.K. Doraiswamy, Director, National Chemical Laboratory, Pune, has been appointed part-time Director of Indian Petrochemicals Corporation Ltd, Baroda. □

PATENTS FILED

580/Del/80: An adjustable joint/connection device for draw bars of animal-drawn vehicles, etc., S.S. Rup, & C.G. Swaminathan—CRRI, New Delhi.

236/Del/81: Improved collapsible stirrer device, S.S. Jain—SERC, Roorkee. □

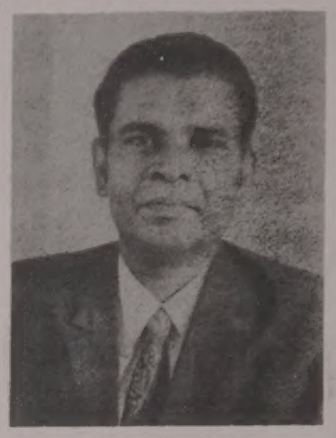
Ferrocement Technology: SERC Course

The Structural Engineering Research Centre (SERC), Roorkee, organized a training course on Ferrocement Technology from 22 June to 3 July 1981. The trainees were drawn from poly nics, roadways corporations, and pr industry. This was the second cours ferrocement technology and was s sored by the Allahabad Polytechn

OBITUARY

Dr R.K. Ghosh

Dr Ram Kinker Ghosh, 48, of Central Road Research Inst (CRRI), New Delhi, died of a h attack on 25 August 1981 at New D



Dr Ghosh is well known for original contributions, acclaimed world over, in concrete technolog both fundamental and applied- applicable to roads and airfields. He to his credit 150 research/techn papers and two books on the subj His research interests covered the wh range of concrete technology, but forte was puzzolonas and their cem saving potential in cement concrete mortars.

Starting his career with CSIR in 1 as Officer on Special Duty at CRRI, Ghosh was appointed Scientist E 1963 and was promoted as Scientist 1977. Prior to joining CRRI, he taught at the Bengal Engineer College, Sibpur, and the Bihar Instit of Technology, Sindri.

Dr Ghosh had had a brilli academic career in the Calcu University (B.E. 1954, C.E. 1955) and the Institute of Highway Engineeri Technical University of Dresd Germany (Dr-Ing. 1960). He w awarded the grade 'Summa cum lau (most excellent), the highest of the fo grades of merit and distinction offer by Germany universities, for doctoral thesis.

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